* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention has the heating rotation member and pressurization rotation member which carry out the pressure welding of the toner image of each other [especially] formed on the record sheet in image formation equipments, such as an electrophotography copying machine and a laser beam printer, about the anchorage device which carries out heating fixing, and are rotated, and relates to the anchorage device which heats the toner image on the record sheet which passes through the fixing field formed of those pressure-welding fields, pressurizes, and is established.
[0002]
[Description of the Prior Art] Said kind of anchorage device may have the high temperature distribution of the fixing field through which a record sheet passes at a crosswise (direction perpendicular to the conveyance direction of a record sheet) end side, when it is low by the other end side, uniform fixing becomes impossible [anchorage device], or a wrinkling may generate it in a record sheet. Therefore, since a toner is fixed to homogeneity, he is trying to store the temperature distribution of a heating roller in a predetermined temperature requirement in fixing wearing of image formation equipment. - (J05) is conventionally [the following technique (J01) and] well-known as such an anchorage device.
(J01) In the official report of ****** given in JP,11-174896,A, temperature distribution are equalized with the lamp for large sizes, concomitant use of the lamp for small sizes, and two or more temperature detection means. Moreover, in order to equalize temperature distribution, two cooling fans are used. For this reason, [0003] which can make temperature distribution into homogeneity for a short time using said cooling fan in case a large size sheet is established after carrying out continuation fixing of the small size sheet, for example, even if the temperature distribution of the fixing field of a large size sheet are uneven (J02) The noncontact sensor is indicated in order to prevent that a blemish is attached to a heating roller by contact to a temperature sensor and a heating roller in the official report of ****** given in JP,10-78728,A.
(J03) When a continuation copy is performed more than setting number of sheets, the technique of performing empty rotation of a fixing roll after job termination is indicated by the patent official report of ****** given in the patent official report No. 2799602.
(J04) The technique which a heating roller is made to carry out pressure-welding follower rotation of the heat homogeneity roll, and equalizes temperature distribution in the official report of ****** given in JP,60-112260,U is indicated.
(J05) The empty turnover time which makes heating roller temperature distribution homogeneity is set up by the elapsed time from the paper size which uses JP,8-211779,A or the heater of one technique given in JP,9-80968,A, and is used by the job, number of sheets, and a last job to degree job.
[0004]
[Problem(s) to be Solved by the Invention] (Trouble of said conventional technique (J01)) With the conventional technique (J01), in order to use two cooling fans, components mark increase and it becomes cost quantity. Moreover, in order to form a temperature detection means in a heating roller (rotation member for heating fixing), a heating roller is worn out, and there is also a possibility that a blemish may occur on an image.
(Trouble of said conventional technique (J02)) With the conventional technique (J02), it is expensive and the present condition is being unable to introduce into a cheap machine from control becoming complicated etc. Moreover, temperature distribution cannot be equalized in a short time.
(Trouble of said conventional technique (J03)) With the conventional technique (J03), the futility of power or time amount occurs irrespective of the elapsed time to the sheet size of the following job, and the following job. Moreover, since the heater for large size sheet fixing is turned ON and empty rotation is performed, fields other than the fixing field of a small size sheet will be heated, and in using a small size sheet, the futility of power occurs.
(Trouble of said conventional technique (J04)) With the conventional technique (J04), in order to use a heat homogeneity roll, the number of components increases, equipment is enlarged and it becomes a cost rise.
(Trouble of said conventional technique (J05)) With the conventional technique (J05), since one heater is used and empty

rotation cannot be performed, heating only a part with low temperature, temperature distribution cannot be equalized in a short time.

[0005] This invention makes a technical problem the following (O01) and the written contents of (O02) in view of the above-mentioned situation.

(O01) Enable it to equalize the temperature distribution of the fixing field formed of the pressure-welding field of the rotation member for heating fixing, and the rotation member for pressurization fixing for a short time.

(O02) Enable it to equalize the temperature distribution of a fixing field, without contacting the contact mold sensor which detects the temperature of the fixing field formed of the pressure-welding field of the rotation member for heating fixing, and the rotation member for pressurization fixing to a heating fixing member.

[0006]

[Means for Solving the Problem] Next, although this invention thought out in order to solve said technical problem is explained, in order to make easy correspondence with the element of the gestalt of the below-mentioned operation, what surrounded the sign of the element of the gestalt of operation in the parenthesis is appended to the element of this invention. Moreover, the reason for making this invention correspond with the sign of the gestalt of the below-mentioned operation, and explaining it is for making an understanding of this invention easy, and is not for limiting the range of this invention to the gestalt of operation.

[0007] (The 1st invention) In order to solve said technical problem, the anchorage device of this invention is characterized by having following requirements for configuration (A01) - (A06).

The rotation member for heating fixing (Fh) and the rotation member for pressurization fixing (Fp) which are established in the non-established toner image on the record sheet which passes through the fixing field (Q5) which rotates and is formed of a pressure-welding field while carrying out a pressure welding mutually, (A01) It compares with the heater (h2;h1+h3) used and said large size sheet at the time of the large size used at the time of large size sheet fixing which has been arranged inside said rotation member for heating fixing (Fh), and has been arranged by extending crosswise [of said record sheet]. (A02) At the time of the small size used at the time of sheet fixing of small size, the heater used (h1), The heating fixing member which has said rotation member for heating fixing (Fh) (Fh+h1+h2;Fh+h1+h3), Last time which memorizes the sheet size and the image recording number of sheets (N) which were used by the job last time A job information storage means (C1), (A03) An elapsed time detection means to measure the elapsed time (T) of the time of the input of a job command signal from the time of job termination last time next time (C2), (A04) The next time which detects and memorizes the sheet size used by the job next time The sheet size storage means of a job (C3), (A05) When the sheet which the sheet used by the job last time uses by the job with a small size sheet next time is a large size sheet, according to said elapsed time (T), only the heater (h1) used is turned ON at the time of said small size. (A06) An empty rotation activation means to perform empty rotation of said rotation member for heating fixing (Fh), and the rotation member for pressurization fixing (Fp) (C4).

[0008] (Operation of the 1st invention) In the anchorage device equipped with said requirements for a configuration, the rotation member for heating fixing (Fh) and the rotation member for pressurization fixing (Fp) are established in the non-established toner image on the record sheet which passes through the fixing field (Q5) which rotates, carrying out a pressure welding mutually, and is formed of a pressure-welding field. At the time of the small size used as compared with the heater (h2;h1+h3) used and said large size sheet at the time of sheet fixing of small size at the time of the large size used for the interior of the rotation member for heating fixing (Fh) of said heating fixing member (Fh+h1+h2) at the time of large size sheet fixing, crosswise, the heater (h1) used is prolonged crosswise [of said record sheet], and is arranged. A job information storage means (C1) memorizes last time the sheet size and the image recording number of sheets (N) which were used by the job last time. An elapsed time detection means (C2) measures the elapsed time (T) of the time of the input of a job command signal from the time of job termination last time next time. The sheet size storage means (C3) of a job detects and memorizes the sheet size used by the job next time next time. When the sheet which the sheet used by the job last time uses by the job with a small size sheet next time is a large size sheet, an empty rotation activation means (C4) turns ON the heater (h1) used according to said elapsed time (T) at the time of said small size, and performs empty rotation of the rotation member for heating fixing (Fh), and the rotation member for pressurization fixing (Fp). The variation in the temperature distribution of said fixing field (Q5) can be equalized by said empty rotation in a short time. If temperature distribution become homogeneity, generating of the paper wrinkling of a record sheet can be prevented.

[0009] (Explanation of the requirements for a configuration of the 1st invention) In the anchorage device of said 1st invention, it is possible to have the following requirements for a configuration (A07).

(A07) The sheet size used by the job last time, and said empty rotation activation means to have last time an empty rotation time setting means (C4a) to set up empty turnover time (Tr) according to the record number of sheets of a job, the sheet size used by the job next time, and said elapsed time (T) (C4). When it has said requirements for a configuration (A07), an empty rotation time setting means (C4a) can set up little useless rational empty turnover time (Tr) according to the sheet size used by the job last time, the sheet size used by the job next time, and said elapsed time (T).

[0010] In the anchorage device of said 1st invention, it is possible to have the following requirements for a configuration (A08) and (A09).

The small size sheet fixing field temperature sensor which detects the temperature of the small size sheet fixing field (R1) which is a fixing field (Q5) through which a small size sheet passes (SN2), (A08) It is the large size sheet fixing field (R2) which is a fixing field (Q5) through which a large size sheet passes. the difference which is said small size sheet fixing field (R1) and the field (R2-R1) with which it does not lap -- the difference which detects the temperature of a fixing field (R3) -- the temperature sensor (SN2+SN3) which has a fixing field temperature sensor (SN3) -- (A09) the case where said elapsed time (T) is predetermined within a time -- said small size sheet fixing field temperature sensor (SN2) and difference -- until the detection temperature of a fixing field temperature sensor (SN3) reaches predetermined temperature Said empty rotation activation means to perform empty rotation while controlling the heater (h1) used at the time of the heater (h1+h3) used and small size at the time of said large size (C4).

[0011] this specification -- setting -- the above (A09) -- "-- said small size sheet fixing field temperature sensor (SN2) and difference -- until the detection temperature of a fixing field temperature sensor (SN3) reaches predetermined temperature -- " -- it has the semantics of a degree.

(1) It is [0012] until the one where detection temperature is lower reaches high temperature and (2) both detection temperature reaches predetermined temperature (t1). When it has said requirements for a configuration (A08), and (A09), the small size sheet fixing field temperature sensor (SN2) of a temperature sensor the temperature of the small size sheet fixing field (R1) which is a fixing field (Q5) through which a small size sheet passes -- detecting -- difference -- a fixing field temperature sensor (SN3) the difference which is the large size sheet fixing field (R2) which is a fixing field (Q5) through which a large size sheet passes, and is said small size sheet fixing field (R1) and the field (R2-R1) with which it does not lap -- the temperature of a fixing field (R3) is detected. When the elapsed time (T) from the termination point in time of a job is in predetermined time (Trest) last time at the time of being about the input (input of a copy start key) of the initiation command signal of a job next time, said empty rotation activation means (C4) -- said small size sheet fixing field temperature sensor (SN2) and difference -- until the detection temperature of a fixing field temperature sensor (SN3) reaches predetermined temperature (t1) Empty rotation is performed controlling the heater (h1) used at the time of the heater (h1+h3) used and small size at the time of said large size. in this case, a small size sheet fixing field temperature sensor (SN2) and difference -- since empty rotation can be ended when the detection temperature of a fixing field temperature sensor (SN3) becomes equal, activation of useless empty rotation can be prevented.

[0013] In the anchorage device of said 1st invention, when it has said requirements for a configuration (A08), and (A09), it is possible to have the following requirements for a configuration (A010) and (A011) further.

The pressurization belt of the shape of an endless thin film which constitutes said rotation member for pressurization fixing (Fp) (Fp), (A010) The press pad which is arranged at the rear-face side of said pressurization belt (Fp), and presses said pressurization belt (Fp) to said rotation member for heating fixing (Fh) (11), The pressurization fixing member which has the belt guide (3 4) arranged along with the moving trucking of said pressurization belt (Fp) at the rear-face side of said pressurization belt (Fp) (Fp+3+4+11), (A011) The temperature sensor arranged at the rear-face side of the pressurization belt (Fp) which passes through said fixing field (Q5) in order to detect the temperature of said fixing field (Q5) (SN2, SN3). When it has said requirements for a configuration (A010), and (A011), a pressurization fixing member (Fp+3+4+11) The pressurization belt of the shape of an endless thin film which constitutes said rotation member for pressurization fixing (Fp) (Fp), The press pad which is arranged at the rear-face side of said pressurization belt (Fp), and presses said pressurization belt (Fp) to said rotation member for heating fixing (Fh) (11), It has the belt guide (3 4) arranged along with the moving trucking of said pressurization belt (Fp) at the rear-face side of said pressurization belt (Fp). A temperature sensor is arranged at the rear-face side of the pressurization belt (Fp) which passes through said fixing field (Q5), and detects the temperature of said fixing field (Q5). Said temperature sensor can detect the temperature of the location of a request of a fixing field (Q5), without contacting a heating rotation member (Fh). Therefore, the temperature of the location of a request of a fixing field (Q5) is controllable in the predetermined range.

[0014] (The 2nd invention) In order to solve said technical problem, the anchorage device of the 2nd invention is characterized by having the following requirements for a configuration (A01), (A02), (A05'), (A08), and (A09).

The rotation member for heating fixing (Fh) and the rotation member for pressurization fixing (Fp) which are established in the non-established toner image on the record sheet which passes through the fixing field (Q5) which rotates and is formed of a pressure-welding field while carrying out a pressure welding mutually, (A01) It compares with the heater (h2;h1+h3) used and said large size sheet at the time of the large size used at the time of large size sheet fixing which has been arranged inside said rotation member for heating fixing (Fh), and has been arranged by extending crosswise [of said record sheet]. (A02) At the time of the small size used at the time of sheet fixing of small size, the heater used (h1), The heating fixing member which has said rotation member for heating fixing (Fh) (Fh+h1+h2;Fh+h1+h3), The next time which detects and memorizes the sheet size used by the job next time next time at the time of the input of a job command signal The sheet size storage means of a job (C3), (A05') The small size sheet fixing field temperature sensor which detects the temperature of the small size sheet fixing field (R1) which is a fixing field (Q5) through which a small size sheet passes (SN2), (A08) It is the large size sheet fixing field (R2) which is a fixing field (Q5) through which a large size sheet passes. the difference which is said small size sheet

fixing field (R1) and the field (R2-R1) with which it does not lap -- the difference which detects the temperature of a fixing field (R3) -- said temperature sensor (SN2+SN3) which has a fixing field temperature sensor (SN3) -- (A09') the case where the sheet size of a job is a large size sheet next time -- said small size sheet fixing field temperature sensor (SN2) and difference -- until the detection temperature of a fixing field temperature sensor (SN3) reaches predetermined temperature Said empty rotation activation means to perform empty rotation while controlling the heater (h1) used at the time of the heater (h2;h3) used and small size at the time of said large size (C4).

[0015] (Operation of the 2nd invention) In the anchorage device of the 2nd invention equipped with said configuration, the rotation member for heating fixing (Fh) and the rotation member for pressurization fixing (Fp) are established in the non-established toner image on the record sheet which passes through the fixing field (Q5) which rotates, carrying out a pressure welding mutually, and is formed of a pressure-welding field. At the time of the small size used as compared with the heater (h2) used and said large size sheet at the time of sheet fixing of small size at the time of the large size used for the interior of the rotation member for heating fixing (Fh) of said heating fixing member (Fh+h1+h2;Fh+h1+h3) at the time of large size sheet fixing, crosswise, the heater (h1) used is prolonged crosswise [of said record sheet], and is arranged. The sheet size storage means (C3) of a job detects and memorizes the sheet size used by the job next time next time next time at the time of the input of a job command signal. The small size sheet fixing field temperature sensor (SN2) of a temperature sensor (SN2+SN3) the temperature of the small size sheet fixing field (R1) which is a fixing field (Q5) through which a small size sheet passes -- detecting -- difference -- a fixing field temperature sensor (SN3) the difference which is the large size sheet fixing field (R2) which is a fixing field (Q5) through which a large size sheet passes, and is said small size sheet fixing field (R1) and the field (R2-R1) with which it does not lap -- the temperature of a fixing field (R3) is detected. the case where the sheet size of a job is a large size sheet next time -- said empty rotation activation means (C4) -- said small size sheet fixing field temperature sensor (SN2) and difference -- empty rotation is performed, controlling the heater (h1) used at the time of the heater (h2;h3) used and small size at the time of said large size until the detection temperature of a fixing field temperature sensor (SN3) reaches predetermined temperature. in this case, a small size sheet fixing field temperature sensor (SN2) and difference -- since empty rotation can be ended when the detection temperature gradient of a fixing field temperature sensor (SN3) becomes predetermined within the limits, activation of useless empty rotation can be prevented. That is, empty turnover time (Tr) can be shortened.

[0016] Following requirements for configuration (A01) - (A02), (A010), (The 3rd invention) The rotation member for heating fixing (Fh) and the rotation member for pressurization fixing (Fp) which are established in the non-established toner image on the anchorage device equipped with (A011), and the record sheet which passes through the fixing field (Q5) which rotates and is formed of a pressure-welding field while carrying out a pressure welding mutually (A01), It compares with the heater (h1+h3) used and said large size sheet at the time of the large size used at the time of large size sheet fixing which has been arranged inside said rotation member for heating fixing (Fh), and has been arranged by extending crosswise [of said record sheet]. (A02) At the time of the small size used at the time of sheet fixing of small size, the heater used (h1), The pressurization belt of the shape of an endless thin film which constitutes the heating fixing member (Fh+h1+h3) which has said rotation member for heating fixing (Fh), and said (A010) rotation member for pressurization fixing (Fp) (Fp), The press pad which is arranged at the rear-face side of said pressurization belt (Fp), and presses said pressurization belt (Fp) to said rotation member for heating fixing (Fh) (11), The pressurization fixing member which has the belt guide (3 4) arranged along with the moving trucking of said pressurization belt (Fp) at the rear-face side of said pressurization belt (Fp) (Fp+3+4+11), (A011) The temperature sensor arranged at the rear-face side of the pressurization belt (Fp) which passes through said fixing field (Q5) in order to detect the temperature of said fixing field (Q5) (SN2, SN3).

[0017] (Operation of the 3rd invention) In the anchorage device of the 3rd invention equipped with said configuration, the rotation member for heating fixing (Fh) and the rotation member for pressurization fixing (Fp) are established in the non-established toner image on the record sheet which passes through the fixing field (Q5) which rotates, carrying out a pressure welding mutually, and is formed of a pressure-welding field. At the time of the small size used as compared with the heater (h1+h3) used and said large size sheet at the time of sheet fixing of small size at the time of the large size used for the interior of the rotation member for heating fixing (Fh) of said heating fixing member (Fh+h1+h3) at the time of large size sheet fixing, crosswise, the heater (h1) used is prolonged crosswise [of said record sheet], and is arranged. Said pressurization fixing member (Fp+3+4+11) The pressurization belt of the shape of an endless thin film which constitutes said rotation member for pressurization fixing (Fp) (Fp), The press pad which is arranged at the rear-face side of said pressurization belt (Fp), and presses said pressurization belt (Fp) to said rotation member for heating fixing (Fh) (11), It has the belt guide (3 4) arranged along with the moving trucking of said pressurization belt (Fp) at the rear-face side of said pressurization belt (Fp). A temperature sensor (SN2, SN3) is arranged at the rear-face side of the pressurization belt (Fp) which passes through said fixing field (Q5), and detects the temperature of said fixing field (Q5). Said temperature sensor can detect the temperature of the location of a request of a fixing field (Q5), without contacting a heating rotation member. Therefore, the temperature of the location of a request of a fixing field (Q5) is easily controllable in the predetermined range.

[0018] (Explanation of the requirements for a configuration of the 1st - the 3rd invention) In said anchorage device of the 1st -

the 3rd invention, it is possible to have the following requirements for a configuration (A012).
(A012) The heater (h2) used is said heating fixing member (Fh+h1+h2) in which it was prepared corresponding to the crosswise overall length of a large size sheet, and the heater (h1) used was formed corresponding to the crosswise overall length of a small size sheet at the time of small size at the time of large size. When it has said requirements for a configuration, at the time of large size, the heater (h2) used is formed corresponding to the crosswise overall length of a large size sheet, and the heater (h1) used is formed corresponding to the crosswise overall length of a small size sheet at the time of small size. Therefore, all the record sheets below the die length of the cross direction of the heater (h1) used can be established by ON of only the heater (h1) used, and OFF at the time of small size at the time of small size. moreover, the time of said small size -- the die length of the cross direction of the heater (h1) used -- long -- and the time of large size -- the record sheet below the die length of the cross direction of the heater (h2) used -- the time of large size -- ON of only the heater (h2) used -- more off Or heating fixing can be performed by carrying out mutual lighting of the heater (h2) used at the rate of a constant ratio according to a paper size at the time of the heater (h1) used and large size at the time of small size. That is, since what is necessary is to perform ON of the heater for fixing at the time of job activation (h1, h2), and off control only to any one heater h1 or h2, they are easy to control.
[0019] Moreover, in said anchorage device of the 1st - the 3rd invention, it is possible to have the following requirements for a configuration (A013).
The heater (h1) used is formed corresponding to the crosswise overall length of a small size sheet at the time of small size. At the time of large size (A013) The heater (h1+h3) used The crosswise overall length of a large size sheet And the crosswise overall length of a small size sheet the difference which is the field (R2-R1) which has the die length (R3=R2-R1) of the difference of (R1), and does not lap the heater (h1) used and crosswise at the time of said small size -- the difference arranged to the fixing field (R3) -- at the heater (h1) used at the time of a heater (h3) and said small size Said constituted heating fixing member (Fh+h1+h3). the case where it has said requirements for a configuration -- a small size sheet -- the time of small size -- the heater (h1) used -- ON and OFF control -- carrying out -- heating fixing -- carrying out -- a large size sheet -- the time of said small size -- the heater (h1) used and difference -- a heater (h3) can be controlled and heating fixing can be carried out.
[0020]
[Embodiment of the Invention] Next, although the gestalt of operation of this invention is explained referring to a drawing, this invention is not limited to the gestalt of the following operations.
(Gestalt 1 of operation) Drawing 1 is the explanatory view of the color picture formation equipment which has the anchorage device of the gestalt 1 of operation of this invention. Image formation equipment U is equipped with the automatic manuscript transport device U1 and the body U2 of image formation equipment (copying machine) which has platen glass PG which supports this in drawing 1 . Said automatic manuscript transport device U1 has manuscript paper output tray TG2 by which the manuscript Gi with which two or more manuscripts Gi which it is going to copy are conveyed by passing through the copy location on said platen glass PG (manuscript reading station) from manuscript medium tray TG1 laid in piles and manuscript medium tray TG1 is discharged.
[0021] Said body U2 of image formation equipment has UI (user interface), the exposure optical system A, etc. to which a user does alter operation of the actuation command signals, such as a copy start. The reflected light from the manuscript (not shown) placed on platen glass PG with the manuscript or hand control which has the platen glass PG top conveyed by said automatic manuscript transport device U1 is changed into the electrical signal of R (red), G (green), and B (blue) by CCD (solid state image sensor) through said exposure optical system A. IPS (image-processing system) changes the electrical signal of said RGB into the image data of Y (yellow), M (Magenta), C (cyanogen), and K (black), memorizes it temporarily, and outputs said image data to the laser drive circuit DL to predetermined timing.
[0022] The front face of the image support (rotation member) PR rotated in the arrow-head Ya direction is uniformly charged with the electrification roll CR, and carries out sequential passage of the latent-image write-in location Q1, the development field Q2, and the primary imprint field Q3. ROS (latent-image write-in equipment) driven by said laser drive circuit DL carries out the exposure scan of the image support PR front face in said latent-image write-in location Q1 by the laser beam L, and forms an electrostatic latent image in an image support PR front face. Sequential formation of the electrostatic latent image corresponding to [when forming a full color image] the image of four colors of Y (yellow), M (Magenta), C (cyanogen), and K (black) is carried out, and when it is a monochrome image, only the electrostatic latent image corresponding to K (black) image is formed.
[0023] The developer G of rotary system has the development counters GY, GM, GC, and GK of four colors of Y (yellow), M (Magenta), C (cyanogen), and K (black) which carry out a sequential rotation to said development field Q2 with rotation of a revolving shaft Ga. The development counters GY, GM, GC, and GK of each of said color have the development roll GR which conveys a developer to said development field Q2, and develop the electrostatic latent image on the image support PR which passes through the development field Q2 in the toner image Tn.
[0024] the slide rails SR and SR of the Uichi Hidari pair under said image support PR -- the slide frame F1 (it displays by the two-dot chain line) -- order (direction perpendicular to space) -- a slide -- it is supported movable. The belt frame F2 of the belt

module BM is supported up and down by the slide frame F1 rotatable at the circumference of hinge shaft F2a. Said belt module BM has two or more belt support rolls (Rd, Rt, Rf, T2a) supported possible [a rotation of said middle imprint belt B], the primary transfer roller T1, contact roll T2c, and said belt frame F2 that supports them. As for said two or more belt support rolls (Rd, Rt, Rf, T2a), said contact roll T2c is in contact with back-up-roll T2a including belt drive roll Rd, a tension roll Rt, an idler roll (free roll) Rf, and back-up-roll T2a.

[0025] Said belt module BM can go in and out to the body U2 of image formation equipment in the condition of it being rotatable and having rotated caudad up and down to the circumference of said hinge shaft F2a, without carrying out [frame / F1 / said / slide] friction contact with said image support PR. Primary imprint electrical potential differences of the electrification polarity and reversed polarity of a toner are impressed by the power circuit E which Controller C controls, and said primary imprint machine T1 imprints the primary toner image Tn of said image support PR front face to the middle imprint belt B in the primary imprint field Q3. In the case of a full color image, the primary toner image Tn of each color of Y, M, C, and K by which sequential formation is carried out is imprinted one by one by the image support PR front face in piles on a middle imprint belt B front face in said primary imprint field Q3, and, finally, a full color multiplex toner image is formed on the middle imprint belt B. In forming a monochromatic mono-color picture, it uses only one development counter, and the primary monochrome toner image is imprinted on the middle imprint belt B. After a primary imprint, a residual toner is cleaned with the image support cleaner CLp, and an image support PR front face is discharged with the electric discharge roll JR.

[0026] the lower part of said back-up-roll T2a -- the slide rails SR and SR of a right-and-left pair -- order (direction perpendicular to space) -- a slide -- the movable secondary imprint slide frame Fs is supported by the cross direction removable to the body U2 of image formation equipment. The secondary imprint rise-and-fall frame Ft of the secondary imprint unit Ut is supported up and down by said secondary imprint slide frame Fs rotatable at the circumference of the hinge shaft Fta. The secondary imprint unit Ut can go in and out to the body U2 of image formation equipment in the condition of having rotated caudad, without carrying out friction contact with said belt module BM. Said secondary imprint unit Ut has secondary transfer roller T2b, the secondary transfer roller cleaner CLt, the roll support lever Lr, the sheet guide SG2 after an imprint, and the sheet conveyance belt BH and said secondary imprint rise-and-fall frame Ft which supports them.

[0027] It is the lever which supports said secondary transfer roller T2b and the secondary transfer roller cleaner CLt, and rotates to the circumference of the hinge shaft La by the motor which is not illustrated, and said roll support lever Lr moves said secondary transfer roller T2b between the positions in readiness distant from the secondary imprint location and the middle imprint belt B in contact with said middle imprint belt B. The secondary imprint field Q4 is formed of the surface of action of said secondary transfer roller T2b and said middle imprint belt B, and the secondary imprint machine T2 is constituted by said secondary transfer roller T2b, said back-up-roll T2a, and contact roll T2c.

[0028] To predetermined timing, it is taken out by the pick up roll Rp, and sells, one sheet dissociates at a time with Roll Rs, and record sheet S held in the medium tray TR1 is conveyed by REJIRORU Rr. Record sheet S conveyed by said REJIRORU Rr doubles timing with said multiplex toner image or monochrome toner image imprinted the 1st order moving to the secondary imprint field Q4, and is conveyed from the sheet guide SG1 before an imprint to the secondary imprint field Q4. In case record sheet S passes through said secondary imprint field Q4, secondary imprint electrical potential differences of the electrification polarity of a toner and like-pole nature are impressed to contact roll T2c of the secondary imprint machine T2 from the power circuit E which Controller C controls. Said secondary imprint machine T2 bundles up the color toner image imprinted by the 1st order of said middle imprint belt B in piles in said secondary imprint field Q4, and imprints it the 2nd order to record sheet S. As for the middle imprint belt B after a secondary imprint, a residual toner is removed by the belt cleaner CLb. Moreover, as for said secondary transfer roller T2b, a surface adhesion toner is recovered by the secondary transfer roller cleaner CLt.

[0029] In addition, said secondary transfer roller T2b and belt cleaner CLb are arranged free [the middle imprint belt B and disjunction (isolation and contact)], and they are being isolated from the middle imprint belt B until the primary non-established toner image of the last color is imprinted by the middle imprint belt B, when a color picture is formed. In addition, said secondary transfer roller cleaner CLt performs disjunction migration together with said secondary transfer roller T2b to the middle imprint belt B. Said record sheet S by which the secondary toner image was imprinted is conveyed to the fixing field Q5 with the after [an imprint] sheet guide SG2, and the sheet conveyance belt BH, and in case it passes through the fixing field Q5, heating fixing of it is carried out by the anchorage device F which it has in the fixing roll (Fh+Fp) of the pair constituted by the heating roller (rotation member for heating fixing) Fh, and the pressure roll (rotation member for pressurization fixing) Fp. Record sheet S fixed to the toner image is discharged by the record sheet discharge tray TR2. The sheet transport device SH is constituted by the element shown with said signs Rp, Rs, Rr, SG1, SG2, and BH.

[0030] (Anchorage device) Drawing 2 is the enlarged drawing of the anchorage device shown in said drawing 1 . Drawing 3 is the III-III line sectional view of said drawing 2 . In drawing 2 and drawing 3 , the heating roller Fh contains the heater h1 used and the large size paper use heater h2 in the interior at the time of small size, and the roll shaft-orientations both ends are supported pivotable by the frame which is not illustrated through Bearing Fha and Fha. Moreover, the roll shaft-orientations both ends of a pressure roll Fp are supported pivotable by the frame which is not illustrated through Bearing Fpa and Fpa. or

[that said heater h1 is a heater established in A4 SEF (conveyance sheet whose front end and back end of A4 short edge feed, i.e., the conveyance direction, are the short edge of the sheet of A4 size), and the die length of it is almost the same as the die length of the short edge of A4 sheet] -- or it is slightly long die length. The heater h1 has the same width of face as the small size sheet fixing field R1 (refer to drawing 3) which is a field through which a small size sheet (the sheet width of face of a direction perpendicular to the sheet conveyance direction is a sheet below A4 SEF) passes. In drawing 3 , in case a heater h1 is established in the sheet of A4 SEF and B5 SEF, in order that it may hold the temperature of the small size sheet fixing field R1 to fixing temperature, OFF control of it is turned on and carried out.

[0031] or [that said heater h2 is a heater used in case A4 LEF (conveyance sheet whose front end and back end of A4 long edge feed, i.e., the conveyance direction, are the long edge of the sheet of A4 size) is established, and the die length of it is almost the same as the die length of the long edge of A4 sheet] -- or it is slightly long die length. The heater h2 has the same width of face as the large size sheet fixing field R2 (refer to drawing 3) which is a field through which a large size sheet (sheet with the sheet width of face of a direction perpendicular to the sheet conveyance direction longer than A4 SEF) passes. As said large size sheet, there is a sheet of A4LEF, A3SEF (A3 short edge feed), B4SEF, and B5 LEF etc., and it is established using a heater h2. In drawing 3 , in order that a heater h2 may hold the temperature of the large size sheet fixing field R2 to fixing temperature, OFF control of it is turned on and carried out. in addition, the difference which is the field of the difference of the large size sheet fixing field R2 and the small size sheet fixing field R1 in drawing 3 -- the fixing field R3 (=R2-R1) is a field which it is heated only at the time of fixing of a large size sheet, and is not heated at the time of fixing of a small size sheet.

[0032] (Explanation of the control section of the gestalt 1 of operation) Drawing 4 is drawing having shown each function with which the control section of the gestalt 1 of operation of the anchorage device of this invention is equipped with the block diagram (functional block diagram). I/O to which Controller C performs I/O of a signal with the exterior, accommodation of I/O signal level, etc. in drawing 4 (input/output interface), ROM a program, data, etc. for performing required processing were remembered to be (read only memory), RAM for memorizing required data temporarily (random access memory), It is constituted by the computer which has CPU (arithmetic and program control) which performs processing according to the program memorized by said ROM, a clock generator, etc., and various functions can be realized by executing the program memorized by said ROM.

[0033] (Signal input element connected to said controller C) As for said controller C, the signal from the signal input element of UI (user interface), and heating roller temperature sensor SN1 (refer to Fig. 2 - the 4th Fig.) and others is inputted. Said UI is equipped with a drop UI 1, the copy start key UI 2, the copy number-of-sheets setting key UI 3, the scale-factor setting key UI 4, and the ten key UI5 grade.

[0034] (Control member connected to said controller C) It connects with the control member of IPS (an image-processing system, i.e., an image processing system), DL (a laser driver, i.e., a laser drive circuit), a power circuit E, the heating roller drive circuit D1 of an anchorage device and the heater drive circuit D2, and others, and Controller C is outputting those actuation control signals again. Said power circuit E supplies power to various kinds of drive circuits, a motor, a heater, etc. Said heating roller drive circuit D1 carries out the rotation drive of the heating roller Fh through the heating roller drive motor M1. The heater drive circuit D2 drives the heaters h1 and h2 built in the heating roller Fh.

[0035] (Function of said controller C) Said controller C performs processing according to the input signal from said signal output element, and has the function which outputs a control signal to said each control member. That is, Controller C has the following function.

C0: The job activation means job activation means C0 performs a copy according to the input of the copy start key UI 2.

C1: Last time [job information storage means], the job information storage means has the record number-of-sheets (copy number of sheets) storage means of a job last time sheet size storage means C1a of a job (the last copy actuation), and last time, and memorizes the information on a job last time.

C1a: Sheet size storage means C1a of a job memorizes last time the sheet size (the die length of the conveyance direction front end edge of a sheet) of the record sheet (copy paper) of a job (copy actuation performed last time) last time [of a job / sheet size storage means].

C1b: Record number-of-sheets storage means C1b of a job memorizes last time the number of sheets (copy number of sheets) of the record sheet of a job (copy actuation performed last time) last time [of a job / record number-of-sheets storage means].

[0036] C2: Elapsed time counter (elapsed time detection means)

The elapsed time counter C2 measures the elapsed time from the termination point in time of a job last time.

Fr1: The elapsed time distinction flag elapsed time distinction flag Fr1 will be set to "0", if initial value is "0", and is set to "1" at the time of count initiation of the measurement time amount of said elapsed time counter C2 and elapsed time is set to 180sec (s).

Fr2: During empty rotation activation, during distinction flag sky rotation activation, initial value is "0", and is set to "1" during an empty rotation activation period, and the distinction flag Fr2 is set to "0" at the time of empty rotation termination.

Fr3: During job activation, during distinction flag job activation, initial value is "0", and is set to "1" during a job activation period, and the distinction flag Fr3 is set to "0" at the time of job termination.
[0037] C3: When there is an input (input of the copy start key UI 2) of the command signal of a job next time, the sheet size detection storage means C2 of a job detects the sheet size of the record sheet used by the job next time, and memorize it the sheet size detection storage means next time of a job next time.
C4: It has empty rotation time setting means C4a, and, as for an empty rotation activation means sky rotation activation means C4, only the time amount set up by empty rotation time setting means C4a performs empty rotation. Said empty rotation time setting means C4a has the empty turnover time formula setting formula parameter setting table [C / C and / four a2] four a1, and sets up empty turnover time.
C four a1: Empty turnover time formula setting table drawing 5 is the explanatory view of the empty turnover time formula setting table C four a1. In drawing 5 , the empty turnover time formula setting table C four a1 has memorized the numeric values 0-3 which specify the empty turnover time formula (graph 2 reference of drawing 6) which computes empty turnover time the sheet sizes G1-G4 of a job, and next time based on the sheet sizes G1-G4 of a job last time.
C four a2: Formula parameter setting table drawing 6 is the explanatory view of the empty turnover time formula setting table C four a2. In drawing 6 , in the parameters a and b of the empty turnover time formula Tr corresponding to the numeric values 0-3 (graph 1 reference of drawing 5) as which the formula parameter setting table C four a2 specifies said empty turnover time formula (graph 2 reference of drawing 6), and each empty turnover time formula Tr corresponding to said numeric values 0-3, it is the table which memorizes a value and said parameters a and b are defined corresponding to said numeric values 0-3.
[0038] C5: According to the output signal of said job activation means C0 and empty rotation activation means C4 grade, the heating roller roll control means heating roller roll control means C5 controls actuation of the heating roller drive circuit D1, and rotates a heating roller Fh.
C6: The heater control means C6 for heater control means fixing for fixing controls actuation of the heater drive circuit D2, and makes the heaters h1 and h2 built in the heating roller Fh turn on and turn off according to the output signal of said job activation means C0 and empty rotation activation means C4 grade.
[0039] Drawing 7 is a graph which shows last time the rest time amount Trest which is the set point of the elapsed time (rest time amount of an anchorage device) T over the print number of sheets N of the last job when the sheet size of a job is large next time which can be started without empty rotation of a job from a job termination time last time next time compared with a job. In drawing 7 , when the sheet size of the record sheet of a job is large next time compared with a job and the print number of sheets at the time of a job is set to N last time, the set point Trest of the elapsed time (rest time amount of an anchorage device) T from a job is as follows last time which can be started without empty rotation of a job next time.
In the case of N< 150, it is Trest>=more than 1.2N (sec).
In the case of N>=150, it is more than Trest>=180 (sec).
Therefore, a job will be started immediately next time, without carrying out empty rotation, when said elapsed time T is T>=Trest and there is an input (input of a copy start key) of the initiation command signal of a job next time.
[0040] Drawing 8 is a graph which shows the set point Trev (sec) of the empty rotation execution time [last time as opposed to the print number of sheets N of a job] Tr in case the elapsed time T to the input (input of a copy start key) of a job initiation command signal is T<Trest next time from a job last time when the sheet size of a job is large next time compared with a job and there is an initiation command input (input of a copy start key) of a job last time next time. In drawing 8 , the set point Trev of the empty turnover time Tr performed when the sheet size of the record sheet of a job is last time large next time compared with a job, and when the print number of sheets at the time of a job is set to N last time, the elapsed time (rest time amount of an anchorage device) T from a job is T<Trest last time and there is an input of an input (copy start key) of the initiation command signal of a job next time is as follows.
In the case of N<=50, it is Trev=0 (sec).
It is Trev=0.6 (N-50) (sec) 50<N<150 case.
In the case of N>=150, it is Trev=60 (sec).
[0041] In addition, the set point Trev of the empty turnover time Tr of said 50<N<150 case can also be set as follows, for example.
Trev=0.6(N-50) x{(Trest-T) /Trest} (sec).
[0042] (Operation of the gestalt 1 of operation) Drawing 9 is the timing diagram of the heating roller temperature control which shows the general example of the heater-on which the heater control means C6 for fixing performs, and OFF control. In drawing 9 , if image formation equipment is turned on, a heater h2 will serve as ON by the heater control means C6 for fixing, and heating roller temperature will rise. It will become ON if said heater h2 will become off if the heating roller temperature which the heating roller temperature sensor SN1 detects becomes more than standby temperature t0, and it becomes less than [standby temperature t0]. Thus, the temperature of a heating roller Fh is held t0 until a copy start key (job initiation signal input key) is turned on. If a copy start key is turned on, either of the heaters h1 or h2 according to the sheet size which

performs image recording will serve as ON, and a heating roller Fh will start rotation to coincidence. If the temperature of a heating roller Fh turns into the copy temperature t1, job initiation is possible, but after only required time amount performs empty rotation, a job (copy actuation) is started.

[0043] Drawing 10 is the flow chart of empty rotation and job executive operation. Processing of each ST (step) of the flow chart of drawing 10 is performed according to the program memorized by ROM of said controller C. Moreover, this processing is performed by multitasking in parallel to other various processings of image formation equipment. The flow chart of the empty rotation shown in drawing 10 and job executive operation is started by power-source ON. In the step ST 1 of drawing 10 , it judges whether the copy start key was turned on. No, in the case of (N), ST1 is repeated and performed. Yes, in (Y), it moves to ST2. In ST2, the elapsed time distinction flag Fr1 with which the elapsed time T from a job termination point in time shows less than 180 sec of upper limits and the above last time judges whether it is "1." Initial value is "0", and said elapsed time distinction flag Fr1 is a flag used as "0", when it is at the job termination time, and is set to "1" and elapsed time exceeds upper-limit 180sec.

[0044] In the case of a no (N), in ST2, it moves to ST13, and, in the case of yes (Y), moves to ST3. In ST3, said elapsed time T judges whether it is T<Trest (Trest=1.2N (refer to drawing 6) and N are the record number of sheets of a job last time). No, in the case of (N), it moves to ST13, and, in the case of yes (Y), moves to ST4. Sheet size is detected in ST4 and it memorizes for the size storage means C3 (refer to drawing 4) next time. Next, in ST5, the empty turnover time formula setting table C four a1 of the graph 1 of a value and drawing 5 memorized by the sheet size detection storage means C3 of a job last time sheet size storage means C1a of a job and next time is used, and the empty turnover time formulas 0-3 are set up. That is, in the graph 1 of drawing 5 , either of the formulas 0-3 (refer to drawing 5 and drawing 6) is set up. Next, in ST6, the set point Trev of the empty turnover time Tr is set up using the parameter setting table C four a2 of a graph 2.

[0045] Next, in ST7, it judges whether it is Tr>0. No, in the case of (N), it moves to ST13, and, in the case of yes (Y), moves to ST8. Next, in ST8, it judges whether it is Tr=a(N-b) <=60 (sec). No, in the case of (N), it moves to ST9, and, in the case of yes (Y), moves to ST10. It is referred to as set point Trev=60sec of the empty turnover time Tr in ST9. In ST10, it considers as distinction flag Fr2= "1" during empty rotation activation. Next, the small size heater h1 used by the job last time in ST11 is turned ON, and Trev (sec) activation of the empty rotation is carried out. In addition, drawing 12 - drawing 15 explain ON of heaters h1 and h2, and OFF control later. After ending empty rotation, in ST12, it considers as distinction flag Fr2= "0" during empty rotation activation.

[0046] Next, in ST13, it considers as distinction flag Fr3= "1" during job activation. Next, activation of a job (next job) is started in ST14. Next, it judges whether the job was completed in ST15. No, in the case of (N), ST15 is repeated and performed. Yes, in (Y), it moves to ST16. Next, in ST16, it considers as distinction flag Fr3= "0" during job activation. Next, it returns to said ST1.

[0047] Drawing 11 is the flow chart of the data storage processing for empty rotation activation decision. Processing of each ST (step) of the flow chart of drawing 11 is performed according to the program memorized by ROM of said controller C. Moreover, this processing is performed by multitasking in parallel to other various processings of image formation equipment. The flow chart of the data storage processing for empty rotation activation decision shown in drawing 11 is started by power-source ON. In the step ST 21 of drawing 11 , it judges whether job activation was started. No, in the case of (N), ST21 is repeated and performed. Yes, in (Y), it moves to ST22. In ST22, the sheet sizes G1-G4 (refer to drawing 5) are memorized to size storage means C1a last time. Next, it judges whether the job was completed in ST23. No, in the case of (N), it moves to ST24. It judges whether the one-sheet copy (image recording) was carried out in ST24. No, in the case of (N), it returns to said ST23. Yes, in (Y), it moves to ST25. The copy number of sheets N is made into N=N +1 in ST25. Next, it moves to ST23.

[0048] In the case of yes (Y), in said ST23, it moves to ST26. In ST26, N is memorized to record number-of-sheets storage means C1b last time. Next, in ST27, the count of the elapsed time T after job termination is started. Next, in ST28, Fr1= "1" is memorized to the elapsed time distinction flag Fr1. Only the period of 0<=T<=180 (sec) of the elapsed time distinction flag Fr1 is the flag with which other periods are set to "0" in "1." Next, in ST29, it judges whether it is T>=180. Yes, in (Y), it moves to ST31, and, in the case of a no (N), moves to ST30. It judges whether empty rotation was started in ST30. The distinction flag Fr2 (ST [of drawing 10]10 - ST12 reference) judges this decision by whether it is Fr2= "1" during said empty rotation activation. No, in the case of (N), it moves to said ST29, and, in the case of return and yes (Y), moves to ST31. The next processing is performed in ST31.

(1) Stop the count of T as T= 0.

(2) Elapsed time distinction flag Fr1= "0" It carries out.

(3) Consider as the record number of sheets N= 0.

Next, it returns to said ST21.

[0049] Drawing 12 is the Maine flow of the flow chart of the heater control processing for fixing of the gestalt 1 of operation of this invention. In addition, the flow chart of this drawing 12 is a flow chart common to the gestalten 2 and 3 of the below-mentioned operation. Processing of each ST (step) of the flow chart of drawing 12 is performed according to the program memorized by ROM of said controller C. Moreover, this processing is performed by multitasking in parallel to other various

processings of image formation equipment. The flow chart of the data storage processing for empty rotation activation decision shown in drawing 12 is started by power-source ON. In the step ST 41 of drawing 12 , it judges whether it is waiting. This decision is judged [both] by whether the distinction flag Fr3 is "0" during the distinction flag Fr2 and job activation during empty rotation activation. Since it is not [empty rotation] under activation by not being, either, either and is not [job / be / it] under activation, either, when both the distinction flags Fr3 are 0 during the distinction flag Fr2 and job activation during empty rotation activation, it judges that it is waiting and becomes yes (Y). Yes, in (Y), it moves to ST42. The subroutine of ST42 is later mentioned by drawing 13 . It returns to the degree of ST42 at said ST41. In the case of a no (N), in said ST41, it moves to ST43.

[0050] In a step ST 43, it judges whether it is under [empty rotation] ******. This decision is judged by whether it is distinction flag Fr2= "1" during empty rotation activation. Yes, in (Y), it moves to ST44. The subroutine of ST44 is later mentioned by drawing 14 . It returns to the degree of ST44 at said ST41. In the case of a no (N), in said ST43, it moves to ST45. In a step ST 45, it judges whether it is under [job activation] ******. This decision is judged by whether it is distinction flag Fr3= "1" during job activation. Yes, in (Y), it moves to ST46. The subroutine of ST46 is later mentioned by drawing 15 . It returns to the degree of ST46 at said ST41. In the case of a no (N), in said ST45, it returns to said ST41.

[0051] Drawing 13 is the flow chart of heater control processing at the time of standby, and is the flow chart of the subroutine of said ST42. In ST 42-1 of drawing 13 , the heating roller temperature t judges whether it is t>=t0 to the set point t0 of standby temperature. Yes, after turning OFF all the heaters h1 and h2 in (Y) and turning ON a heater h2 by ST 42-3 at ST41 of said drawing 12 in the case of return and a no (N), it returns to said ST41. That is, ON of a heater h2 and OFF are performing temperature control of a heating roller Fh during standby.

[0052] Drawing 14 is the flow chart of heater control processing at the time of empty rotation, and is the flow chart of the subroutine of said ST44. In ST 44-1 of drawing 14 , the heating roller temperature t judges whether it is t>=t1 to the set point t1 of fixing temperature. No, in the case of (N), it moves to ST 44-2. In ST 44-2, after turning ON the heater (heater h1 for small size sheet fixing) used last time at the time of a job, it returns to ST41 of said drawing 12 . In the case of yes (Y), in said ST 44-1, it moves to ST 44-3. All heaters are turned OFF in ST 44-6. Next, it returns to ST41 of said drawing 12 .

[0053] Drawing 15 is the flow chart of job execution-time heater control processing, and is the flow chart of the subroutine of said ST46. In ST 46-1 of drawing 15 , the heating roller temperature t judges whether it is t>=t1 to the set point t1 of the fixing temperature at the time of job activation. Yes, after turning ON the heater corresponding to the sheet size which uses it for ST41 of said drawing 12 by the job by ST 46-3 in the case of return and a no (N) after turning OFF all the heaters h1 and h2 in (Y), it returns to ST41 of said drawing 12 . That is, ON of the heater corresponding to the sheet size used by the job and OFF are performing temperature control of a heating roller Fh during job activation.

[0054] Immediately after drawing 16's being a graph for explaining the operation effectiveness of the gestalt 1 of said operation, and carrying out the 100-sheet continuation copy of the sheet (small size sheet) of A4 SEF using a solid roll (pressure roll of rubber material which the pressure roll or front face of rubber material made cover tubes, such as PFA) It is drawing showing the paper wrinkling incidence rate of said large size sheet (A3SEF sheet) when copying to 50 sheets (large size sheet) of A3 SEF, and the grade of a paper wrinkling according to the class of anchorage device. In drawing 16 , "with no cure", an "improvement heating roller", "large size heater sky rotation", and "gestalt 1 sky rotation of operation" are used in the sense of a degree.

(1) -- the case where used the heating roller of the same configuration as the gestalt 1 of "with [no cure]" -- operation, and a job is performed without empty rotation after rest time amount 50sec next time.

(2) "improvement heating heater" -- When a heating heater whose calorific value distribution of the heaters h1 and h2 of the gestalt 1 of operation decreases in a large size sheet imprint field side (it is right-hand side at drawing 3) was used and a job is performed without empty rotation after rest time amount 50sec next time.

(3) -- "large size heater sky rotation" -- the case where used the heating roller Fh of the gestalt 1 of operation, determined it as the gestalt 1 of operation of the empty rotation execution time similarly, turned ON the large size heater (heater used by the job next time) h2, and empty rotation (it is 30sec sky rotation after rest time amount 20sec) is carried out.

(4) -- "small size heater sky rotation" -- the case where turned ON the small size heater (heater used by the job last time) h1, and empty rotation (it is 30sec sky rotation after rest time amount 20sec) is carried out by the approach of the gestalt 1 said operation.

[0055] Moreover, in drawing 16 , G1-G5 are the indexes of extent of a wrinkling, G1 shows what has it, and G5 shows what has it. [there is little wrinkling and small] [there is much wrinkling and large] As compared with the thing of others [the gestalt 1 of operation of this invention], there is little generating of a wrinkling and it is small so that drawing 16 may show.

[0056] Drawing 17 is a graph for explaining the operation effectiveness of the gestalt 1 of said operation, and drawing 17 A carries out the 100-sheet continuation copy of the sheet (small size sheet) of A4 SEF by the job last time. Drawing showing relation with the grade of the paper wrinkling generated on the rest time amount (from a job termination point in time to next time [Last time] elapsed time to job initiation) and said A3SEF sheet when copying to 50 A3SEF sheets (large size sheet) by the job next time, Drawing 17 B is drawing showing the relation between the empty turnover time when carrying out the 100-

sheet continuation copy of the sheet (small size sheet) of A4 SEF by the job last time, and copying to 50 sheets (large size sheet) of A3 by the job next time, and the grade of the paper wrinkling generated on said A3SEF sheet. Since generating of a paper wrinkling can be prevented by performing empty rotation in a short time so that drawing 17 A and drawing 17 B may be compared and understood, it is thought by performing empty rotation that the temperature distribution of a heating roller Fh can be equalized in a short time.

[0057] Drawing 18 is the graph which shows the incidence rate according to grade of the paper wrinkling of a sponge roll and a solid roll. Drawing 18 A carries out the 100-sheet continuation copy of the sheet (small size sheet) of A4 SEF by the job last time using a sponge roll. Drawing showing relation with the grade of the paper wrinkling generated on the rest time amount (from a job termination point in time to next time [Last time] elapsed time to job initiation) and said A3SEF sheet when copying to 50 A3SEF sheets (large size sheet) by the job next time, Drawing 18 B carries out the 100-sheet continuation copy of the sheet (small size sheet) of A4 SEF by the job last time using a solid roll. It is drawing showing relation with the grade of the paper wrinkling generated on the rest time amount and said A3SEF sheet when copying to 50 A3SEF sheets (large size sheet) by the job next time. Drawing 19 is the graph which shows change of a sponge roll and a solid roll of nip (Nip) width of face (sheet conveyance lay length of the pressure-welding field of a heating roller and a pressure roll). The time of drawing 19 A carrying out the 100-sheet continuation copy of the sheet (small size sheet) of A4 SEF by the job last time using a sponge roll, Drawing showing the relation between change of nip width of face, the location of roll shaft orientations, and rest time amount (last time elapsed time from a job termination point in time), The time of drawing 19 B carrying out the 100-sheet continuation copy of the sheet (small size sheet) of A4 SEF by the job last time using a tube solid roll (roll which covered the solid roll with the tube of the good quality of the material of a mold-release characteristic), It is drawing showing change of nip width of face, the location of roll shaft orientations, and relation with rest time amount.

[0058] O/B of said drawing 19 means the out side (a before side or outside) of image formation equipment, and I/B means Inn (an after side or back side). And a before side (O/B) is the left-hand side part of said drawing 3 , and is the small size sheet fixing field R1 side. moreover, the backside (I/B) -- the right-hand side part of said drawing 3 -- it is -- difference -- it is the fixing field R3 side (field side where only fixing of a large size sheet is performed and fixing of a small size sheet is not performed). As compared with a sponge roll, by the large size sheet fixing field R2 side (at the time of small size sheet continuation transit field side where a temperature rise is large), nip width of face is large and a solid roll changes so that said drawing 19 A and drawing 19 B may be compared and understood (increment). Moreover, although a solid roll has much generating of the bad paper wrinkling of grade as compared with a sponge roll so that drawing 18 may show, it is a cause that this has a large change of the nip width of face of heating roller shaft orientations as shown in said drawing 19 .

[0059] Since it can equalize the temperature distribution of the cross direction of the fixing field Q5 in a short time even if the heating roller Fh which used the solid roll which the above-mentioned paper wrinkling tends to generate is used for the gestalt 1 of this operation mentioned above, it can make homogeneity said nip width of face in each location of said heating roller shaft orientations. For this reason, it can do [preventing generating of a paper wrinkling, or].

[0060] (Gestalt 2 of operation) Drawing 20 is the flow chart of heater control processing at the time of empty rotation of the color picture formation equipment which has the anchorage device of the gestalt 2 of operation of this invention, is drawing equivalent to drawing 14 of the gestalt 1 of said operation, and is the flow chart of the subroutine of ST44 of said drawing 12 . In addition, in explanation of the gestalt 2 of this operation, the same sign is given to the component corresponding to the component of the gestalt 1 of said operation, and that detailed explanation is omitted. The gestalt 2 of this operation is constituted like the gestalt 1 of said operation in respect of others, although heater control processing is different from the gestalt 1 of said operation at the time of empty rotation. At the time of empty rotation of the gestalt 2 of this operation, heater control processing (refer to drawing 20) is the point of turning ON the heater h2 for large size sheet fixing of a job by turns last time the heater h1 for small size sheet fixing of a job, and next time, and performing empty rotation, and differs from the gestalt 1 of said operation shown in drawing 14 which turns on and off only the heater for small size sheet fixing.

[0061] In ST 44-11 of drawing 20 , the heating roller temperature t judges whether it is t>=t1 to the set point t1 of fixing temperature. No, in the case of (N), it moves to ST 44-12. In ST 44-12, it judges whether it is heating heater selection flag Fr4= "0." In addition, the initial value of Fr4 is Fr4= "0." Yes, in (Y), it moves to ST 44-13. In ST 44-13, after turning ON the heater (heater for small size sheet fixing) h1 used last time at the time of a job, it returns to ST41 of said drawing 12 . In the case of a no (N) (in the case of Fr4= "1"), in said ST 44-12, it moves to ST 44-14. After turning ON the heater (heater for large size sheet fixing) h2 used in ST 44-14 next time at the time of a job, it returns to ST41 of said drawing 12 .

[0062] In the case of yes (Y), in said ST 44-11, it moves to ST 44-15. In ST 44-15, it judges whether there are heaters h1 and h2 of ON. Yes, in (Y), it moves to ST 44-16 (when it is). All heaters are turned OFF in ST 44-16. Next, in ST 44-17, it judges whether it is heating heater selection flag Fr4= "0." After moving to ST 44-18 and making it into heating heater selection flag Fr4= "1" in ST 44-18 in ST 44-17 in the case of yes (Y) (in the case of Fr4= "0"), it returns to ST41 of said drawing 12 . After moving to ST 44-19 and making it into heating heater selection flag Fr4= "0" in ST 44-19 in said ST 44-17 in the case of a no (N) (in the case of Fr4= "1"), it returns to ST41 of said drawing 12 . In the case of a no (N), in said ST 44-15, it returns to ST41 of said drawing 12 . Although the heater h1 for small size sheet fixing and the heater h2 for large size sheet fixing were turned

ON by turns with the gestalt 2 of this operation at the time of empty rotation, it is possible to constitute so that it may be made to turn on and turn off with the duty ratio set up beforehand.

[0063] (Gestalt 3 of operation) Drawing 21 is the explanatory view of the color picture formation equipment which has the anchorage device of the gestalt 3 of operation of this invention. Drawing 22 is the enlarged drawing of the anchorage device shown in said drawing 21 . Drawing 23 is the XXIII-XXIII line sectional view of said drawing 22 . In addition, in explanation of the gestalt 3 of this operation, the same sign is given to the component corresponding to the component of the gestalt 1 of said operation, and that detailed explanation is omitted. The gestalt 3 of this operation is constituted like the gestalt 1 of said operation in respect of others, although it is different from the gestalt 1 of said operation in respect of the following. Image formation equipment U equipped with the anchorage device of the gestalt 3 of operation is using the pressurization belt (rotation member for pressurization fixing) Fp instead of the pressure roll Fp of the gestalt 1 of said operation. The pressurization belt Fp is formed with the thin film-like endless belt, and the frame support shaft 1 prolonged crosswise [of the pressurization belt Fp] is arranged inside the pressurization belt Fp endless [said]. The frame support shaft 1 is connected with the rotation lever of the pair which the both ends of the belt cross direction do not illustrate, and moves between the location approached to the heating roller Fh at the time of rotation of said rotation lever which is not illustrated, and the isolated location.

[0064] The belt support frame 2 prolonged in the shaft orientations is being fixed to said frame support shaft 1, the belt guides 3 and 4 are connected with the side face of the belt support frame 2, and two or more cylinder members 6 keep spacing in the shaft orientations of a heating roller Fh, and are being fixed to the belt support frame 2. The cylinder 7 is supported up and down by each cylinder member 6 possible [a slide], and the pad supporter material 8 prolonged in heating roller shaft orientations is being fixed to the upper limit of a cylinder 7. The heel of the pin (not shown) which penetrates said cylinder 7 is engaging with the long hole (not shown) prolonged in the shaft orientations formed in the side attachment wall of said cylinder member 6, and said cylinder 7 is movable within limits which said pin (not shown) can move to shaft orientations within said long hole (not shown). The hard belt press member 9 is being fixed to the side face of the pad supporter material 8 fixed to said cylinder 7 upper limit, and the press pad 11 which has elasticity is supported by the top face of the pad supporter material 8. Compression spring 12 is arranged on the outside of said cylinder member 6, and compression spring 12 is always pressing the pad supporter material 8 to the heating roller Fh side. The pressurization fixing member (Fp, 1-12) of the gestalt 3 of this operation is constituted by the element shown in said sign Fp and 1 - 12 grade.

[0065] In drawing 22 , said belt press member 9 and the press pad 11 are pressing the pressurization belt Fp from the rear-face side to the heating roller Fh with said compression spring 12. Since the belt press member 9 is formed with hard material rather than the heating roller Fh, it is deforming into the concave the part pressed by said hard belt press member 9 for the front face of a heating roller Fh. The record sheet which passes through the fixing field Q5 which is a pressure-welding field of a heating roller Fh and the pressurization belt Fp according to this deformation is easy to exfoliate from a heating roller Fh front face. In the contact section with said pressurization belt (pressurization rotation member) Fp of said press pad 11 The small size sheet fixing field temperature sensor SN2 which detects the temperature of a fixing field as shown in drawing 23 , the large size sheet fixing field R2 which is the fixing field Q5 through which a large size sheet passes -- and the difference which is said small size sheet fixing field R1 and the field (R2-R1) with which it does not lap -- the difference which detects the temperature of the fixing field R3 (=R2-R1) -- the fixing field temperature sensor SN3 is arranged.

[0066] (Explanation of the control section of the gestalt 3 of operation) Drawing 24 is drawing having shown each function with which the control section of the gestalt 3 of operation of the anchorage device of this invention is equipped with the block diagram (functional block diagram).

(Signal input element connected to Controller C) instead of [of the heating roller temperature sensor SN1 which shows Controller C to drawing 4 of the gestalt 1 of said operation] -- the small size sheet fixing field temperature sensor SN2 and difference -- the signal from the fixing field temperature sensor SN3 and other signal input elements is inputted.

SN2: The smallness size sheet fixing field temperature sensor smallness size sheet fixing field temperature sensor SN2 detects the small size sheet fixing field temperature ts.

SN3: -- difference -- a fixing field temperature sensor -- difference -- the large size sheet fixing field R2 which is the fixing field Q5 where a large size sheet passes the fixing field temperature sensor SN3 -- and the difference which is said small size sheet fixing field R1 and the field (R2-R1) with which it does not lap -- the temperature tm of the fixing field R3 (=R2-R1, i.e., the field through which only a large size sheet passes) is detected.

(Control member connected to Controller C) It connects with the same control member as the gestalt 1 of operation shown in said drawing 4 , and Controller C is outputting those actuation control signals again.

[0067] (Function of said controller C) Said controller C performs processing according to the input signal from said signal output element, and has the function which outputs a control signal to said each control member. That is, Controller C has the following function.

C0: A job activation means job activation means, C0 [i.e.,], performs a copy according to the input of the copy start key UI 2.

Fr2: During empty rotation activation, during distinction flag sky rotation activation, initial value is "0", and is set to "1" during an

empty rotation activation period, and the distinction flag Fr2 is set to "0" at the time of empty rotation termination.
Fr3: During job activation, during distinction flag job activation, initial value is "0", and is set to "1" during a job activation period, and the distinction flag Fr3 is set to "0" at the time of job termination.
[0068] C4: An empty rotation activation means sky rotation activation means C4 has fixing field temperature-gradient detection means C4a, and when there is an input of the start signal input key (copy start key UI 2) of a job next time and there is no detection temperature gradient of the small size sheet fixing field temperature sensor SN2 and the large size sheet fixing field temperature sensor SN3 within the predetermined range, it performs empty rotation until said detection temperature gradient becomes predetermined within the limits.
C5: According to the output signal of the job activation means C0 and empty rotation activation means C4 grade, the heating roller roll control means heating roller roll control means C5 controls actuation of the heating roller drive circuit D1, and rotates a heating roller Fh.
C6: The heater control means C6 for heater control means fixing for fixing controls actuation of the heater drive circuit D2, and makes the heaters h1 and h2 built in the heating roller Fh turn on and turn off according to the output signal of the job activation means C0 and empty rotation activation means C4 grade.
[0069] (Operation of the gestalt 3 of operation) Drawing 25 is the flow chart of empty rotation of the gestalt 3 of operation, and job executive operation, and is drawing corresponding to drawing 10 of the gestalt 1 of said operation. Processing of each ST (step) of the flow chart of drawing 25 is performed according to the program memorized by ROM of said controller C. Moreover, this processing is performed by multitasking in parallel to other various processings of image formation equipment. The flow chart of the empty rotation shown in drawing 25 and job executive operation is started by power-source ON. the processing shown in this drawing 25 -- ST2- of drawing 10 of the gestalt 1 of said operation -- ST7 and ST9 are omitted and it is equivalent to what prepared ST8' instead of ST8 of drawing 10 , and added ST 11-1 further. In the step ST 1 of drawing 25 , it judges whether the copy start key was turned on. No, in the case of (N), ST1 is repeated and performed. Yes, in (Y), it moves to ST8'. ST8' -- setting -- difference -- it judges whether the difference (tm-ts) of the fixing field temperature (temperature of the fixing field through which only a large size sheet passes) tm, and the small size sheet fixing field temperature ts is larger than the allowable-temperature difference ta. No, in the case of (N), it moves to ST13, and, in the case of yes (Y), moves to ST10.
[0070] In ST10, it considers as distinction flag Fr2= "1" during empty rotation activation. Next, in ST11, the heater h1 for small size sheet fixing is turned ON, and empty rotation is started. Next, in ST 11-1, it judges whether the difference (tm-ts) of the large size sheet fixing field temperature tm and the small size sheet fixing field temperature ts turned into below the allowable-temperature difference ta. No, in the case of (N), ST 11-1 performs repeatedly, and, in the case of yes (Y), it moves to ST12. Next, in ST12, it considers as distinction flag Fr2= "0" during empty rotation activation.
[0071] Next, in ST13, it considers as distinction flag Fr3= "1" during job activation. Next, activation of a job (next job) is started in ST14. Next, it judges whether the job was completed in ST15. No, in the case of (N), ST15 is repeated and performed. Yes, in (Y), it moves to ST16. Next, in ST16, it considers as distinction flag Fr3= "0" during job activation. Next, it returns to said ST1.
[0072] The Maine flow of the flow chart of the heater control processing for fixing in the gestalt 3 of this operation is completely the same as that of drawing 12 of the gestalt 1 of said operation. Moreover, the flow chart (flow chart of the subroutine of ST42 of said drawing 12) of heater control processing is completely the same as that of drawing 13 of the gestalt 1 of said operation at the time of standby of the gestalt 3 of this operation. Moreover, the flow chart (flow chart of the subroutine of ST46 of said drawing 12) of job execution-time heater control processing of the gestalt 3 of this operation is completely the same as that of drawing 15 of the gestalt 1 of said operation. Drawing 26 is the flow chart of heater control processing at the time of empty rotation of the gestalt 3 of operation, is a flow chart corresponding to drawing 14 of the gestalt 1 of said operation, and is the flow chart of the subroutine of ST44 of said drawing 12 . In ST 44-21 of drawing 26 , it judges whether it is tm-ts>=ta. Yes, in (Y), it moves to ST 44-22. In ST 44-22, after turning ON the heater h1 for small size sheet fixing, it returns to ST41 of said drawing 12 . After turning OFF all heaters in ST 44-23 in said ST 44-21 in the case of a no (N), it returns to ST41 of said drawing 12 .
[0073] With the gestalten 1-3 of said the operation of each, in case the temperature of the fixing field Q5 formed of the pressure-welding field of the rotation member Fh for heating fixing and the rotation member Fp for pressurization fixing is detected, a contact mold sensor can be detected, without making the sheet passage field of the rotation member Fh front face for heating fixing contact. For this reason, since damage on the front face of the rotation member Fh for heating fixing can be prevented, deterioration of the image quality by damage on the rotation member front face for heating fixing can be prevented.
[0074] (Example of modification) Although the gestalt of operation of this invention was explained in full detail above, this invention can make various change within the limits of the summary of this invention which is not limited to the gestalt of said operation and indicated by the claim. The gestalt of modification implementation of this invention is illustrated below.
(H01) This invention can be applied to image formation equipments other than a copying machine, for example, a printer, FAX, etc.

(H02) In the gestalt 1 of said operation, in T<Trest, the elapsed time T from a last job when there is an input (input of a copy start key) of the following job initiation signal has set up the empty turnover time Tr to Trest by formula Tr=a (N-b) shown in the graph 2 of drawing 6 , but it is also possible to use a degree type etc. as a formula.
The thing of arbitration to do for number arrangement is possible for a Tr=a(N-b)x(Trest-T)/Trest (H03) temperature sensor in the various locations of the fixing field Q5 and its near.
[0075]
[Effect of the Invention] The image formation equipment of above-mentioned this invention can do the following effectiveness (E01) so.
(E01) The temperature distribution of the fixing field formed of the pressure-welding field of the rotation member for heating fixing and the rotation member for pressurization fixing can be equalized in a short time. For this reason, generating of a paper wrinkling, offset, etc. can be prevented. Since temperature distribution tend to become an ununiformity, what made thickness of a heating roller thin in order to shorten especially a warm uptime is effective. moreover, the high-speed machine which needs to make small the total load applied to a heating roller from the threshold value of allowable bending stress by making it thin meat, and needs to take large Nip width of face -- receiving -- a sponge roll -- deteriorating -- being easy -- ** -- saying -- demerit -- ****** -- it is effective when using a solid roll for a sake.
(E02) It is possible to equalize the temperature distribution of a fixing field, without contacting the contact mold sensor which detects the temperature of the fixing field formed of the pressure-welding field of the rotation member for heating fixing and the rotation member for pressurization fixing to a heating fixing member.

[Translation done.]